Case Study 2: Dinosaur Isle Museum

Dinosaur Isle Museum, Isle of Wight.

A resource for schools & colleges.

Using geological materials to make pottery: Practical scientific experimentation.

A RESOURCE FOR SCHOOLS & COLLEGES.

Links with:
Science, Art and design, History

Issue 1. April 2016

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2. ABOUT THIS DOCUMENT

The function of this case study is to provide information to schools, colleges and other learning groups. It records an activity conducted with a local children’s archaeological society when they collected local clay, made objects from it and then compared them to ancient artefacts.

This Case Study is one of a series of resources produced for schools and the wider education community.

This document is provided as an on-line resource from the Dinosaur Isle website, in order to minimize the environmental impact of producing a printed version.

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3. INTRODUCTION

The following article includes an extract from a 2006 newsletter produced by Dinosaur Isle. It records the activity and the feedback we received from the participants. We would encourage schools to have a go at this activity themselves, but to use their own local sources of real clay. The objects we made were constructed from sedimentary sources collected from local beaches on the Isle of Wight. It demonstrated the way in which our ancestors were able to produce pottery from local resources, and that the use of different materials produced different colours and textures.
4. **WHERE ARE WE?**

At the northern end of Sandown Bay, on the south-east side of the Isle of Wight. The museum is built over rocks that were deposited during the early Cretaceous.

5. **AIMS**

The aims of the activity were –

- To identify possible collecting sites
- To collect and recover clays that may have been available to our ancestors
- To process and make objects that were in use in the past (e.g. pots and tiles)
- To explore a simple method of firing
- To analyse the results
6. METHODS

The published article describes the process more fully, but essentially the group collected samples of clay from two beaches. This was brought back to the museum where it was allowed to dry for a few days. Twigs and leaves were removed from the clay. A sample of multi-coloured clay from Priory Bay had also previously been collected. That sample contained a large number of fossilised gastropod shells. As the clay dried out these were sieved out. We broke them up and mixed them with other clays to try and represent the fabric of ancient pottery which sometimes shows small spots of ground shell mixed in.

The group then manufactured ‘coil’ pots here at the museum. Tiles, small branching ornaments and beads were also manufactured. These were then packed and taken to the garden of a house where some experimental cookery was taking place in a fire-pit. After the fire had gone out the pots and other items were placed into the very hot ashes of the fire, and the area was covered over with turf. This was left for a few days to cool. It was then uncovered and the items removed. Unfortunately the fire was still very hot and a number of items ‘popped’ as they were exposed to the air.

The items (and fragments) were then removed and transported to Dinosaur Isle where a number of the original makers attempted to piece their items back together using glue suitable for the fired clay.

Picture 1: The turf kiln at Joy’s house, 13th May 2006
7. MATERIALS & COLLECTING LOCATIONS

Clays were collected from two local beaches; from Yaverland to Culver (at the northern end of Sandown Bay, near to Dinosaur Isle), and in Priory Bay (which lies between St. Helen’s and Nettlestone on the north-east coast of the Island. The clays were Lower Cretaceous in age from Sandown Bay, Upper Cretaceous from Culver Cliff, and Palaeogene/Oligocene in age from Priory Bay.

<table>
<thead>
<tr>
<th>Priory Bay</th>
<th>Group of rock</th>
<th>Period</th>
<th>Rock unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green clay</td>
<td>Solent Group</td>
<td>Oligocene</td>
<td>High in the Bembridge marls</td>
</tr>
<tr>
<td>Grey clay with small gastropod fossils</td>
<td>Solent Group</td>
<td>Oligocene</td>
<td>Bembridge Marls</td>
</tr>
<tr>
<td>Orange, blue and grey clay</td>
<td>Solent Group</td>
<td>Palaeogene</td>
<td>Seagrove Bay Member</td>
</tr>
<tr>
<td>Sandown Bay / Yaverland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White and grey chalk</td>
<td>Chalk Group</td>
<td>Upper Cretaceous</td>
<td>Grey Chalk</td>
</tr>
<tr>
<td>Black/Grey clay</td>
<td>Selborne Group</td>
<td>Lower Cretaceous</td>
<td>Gault Clay</td>
</tr>
<tr>
<td>Yellow clay</td>
<td>Lower Greensand Group</td>
<td>Lower Cretaceous</td>
<td>Ferruginous Sands</td>
</tr>
<tr>
<td>Red ochre clay</td>
<td>Lower Greensand Group</td>
<td>Lower Cretaceous</td>
<td>Ferruginous Sands</td>
</tr>
<tr>
<td>Blue/Grey and brown Clays</td>
<td>Lower Greensand Group</td>
<td>Lower Cretaceous</td>
<td>Chale Clay</td>
</tr>
<tr>
<td>Grey Clay</td>
<td>Wealden Group</td>
<td>Lower Cretaceous</td>
<td>Vectis Formation</td>
</tr>
<tr>
<td>Pink and grey silty clays</td>
<td>Wealden Group</td>
<td>Lower Cretaceous</td>
<td>Wessex Formation</td>
</tr>
</tbody>
</table>

Table 1: selection of rocks used in the project.
Map 2: Collecting locations and overview of Island geology.

Picture 2: The Wessex Formation at Yaverland. Pink and grey siltstones and muds were deposited on a former river floodplain in alternating dry and wet conditions.

Picture 3: The Gault Clay at Yaverland. Grey clays were deposited on a former sea-floor in low-oxygen conditions.
8. **NEWSLETTER ARTICLE**

The article follows as a re-print from the original newsletter ‘Dinosaur Diaries – December 2006’ written by the author, Trevor Price.
Geology has always been a fascinating subject to me, and there are so many exciting areas that can be studied.

However when trying to introduce a sceptical public to the joys of what may be a favourite subject to you just how do you find a way of inspiring them?

The aim
Early in January 2006 I started an experimental project on the natural clays of the Isle of Wight. The aim was to introduce learners to the variety of clays on the island – we did this by getting them to collect samples of clay from various beaches, make them into pots and other clay objects, fire them using an ancient technique and then finally compare them with Neolithic items held in the Isle of Wight Heritage Service’s collection. Records were kept of which clay was used in order to see if any were more suitable than others.

Who took part
Participants included the Isle of Wight branch of the Young Archaeologist’s Club, the local Neolithic studies group who were investigating ancient farming techniques on the Island, and a number of local archaeologists. Access was provided to some of the county’s ancient clay pot fragments at the Ryde store.

The geology bit
The Isle of Wight is made of many types of sedimentary rocks; including limestones like the white Chalk, sandstones, mudstones and clay. There are many different types and colours of clays exposed all around its coastline which provided a useful starting point.

The clays used ranged in age from 124 million year old blue, grey and pink Wessex silty-mudstones collected at Yaverland to 35 million year old black and bright-green clays from the Seagrove Bay Member. The bright blue Chale Clay was also collected from Yaverland. Lumps of Chalk, and fossil snails, were collected to add to the mix of clays.

Collecting the clay
The collecting started in a very cold January and continued into February. Tubs of clay were filled and sorted into marked bags ready to use. This was the first hint that the project was going to get very messy!

The clays were made into pots at Dinosaur Isle on two separate occasions by the adults’ and children’s groups. After the pots had dried we moved to Joy’s spacious garden where we were able to fire the pots in the base of a bonfire, using turfs to keep in the heat.

Firing (and repairing the damage!)
Retrieving the pots and other items from the fire after a few days proved somewhat difficult. This was an adult-only day for safety reasons. There had been some rain before the turf on the fire could be removed and a number of the pots near the top had exploded. The pots nearer the base had survived reasonably well, as had a number of clay beads. The fire was still so hot that even with gloves and oven tongs I managed to develop a sun-tan!

Back at Dinosaur Isle members of the Young Archaeologists’ Club glued some of the pots back together and it became apparent that a few of the pots had distorted in the heat. There was no relationship to the type of clay or the size of pot, so the distortion may have occurred as a result of other factors like the heat or water content.
Using a microscope to look at the fabric of one of the pots the group made.

The project attracted more individuals as the weeks rolled by. It was good fun and there is an enthusiasm to repeat the experiment with a wider audience if we can get a safe place to do the firing.

This project would not have happened without the enthusiasm and help of Delian Backhouse-Fry from the Young Archaeologists' Club, Joy Verrinder from Carisbrooke Castle Museum, Corina Westwood from the Isle of Wight Heritage Service and a host of other volunteers.

Outcomes

Samples of the clay pots were compared with fragments of ancient pottery held at the museum collection at Ryde, and it was hard to see any differences either in hand specimen or down the microscope.

Powdered chalk and fossil snails were mixed in to some of the clay to see if we could match the fabric of some ancient pot fragments in the museum collections - and in the end they matched extremely well. I understand this mix gets called 'grog' by archaeologists.

It was relatively easy to make the pots although the whole process took some time. Given that the pots are not all that robust and Neolithic pottery usually only survives as fragments the original pots were possibly treated as disposable items.

I had heard that this kind of pottery, when it is found in the ground, is described as being like wet 'dog biscuit'. Our final pots looked like dog biscuit that had been put in a fire. I don't think there would have been many dogs who would have eaten it though...

Evaluation

When the project was over we held two group evaluations (one for the adults and one for the children). The oldest and youngest clays turned out to be the best to use. The Gault Clay was difficult to shape, but fired well. Several members acquired new skills in shaping the pots. The adults marked the project as 5 out of 5 for enjoyment, with both adults and children identifying the making and reassembly of the broken pots as the most enjoyable part. The adults were inspired to go and collect more clay, and to try to build a sled or basket to transport the clay. The adults expressed interest in making a display of the outcome of the project in our Education Room.

Progression

After we had finished the experimental work a number of the 'Neolithic farmers' went away and tried some different firing regimes. They had more success with the pots surviving. We think that we may have overheated some of our first pots and had not allowed them to cool down for long enough before exposing them to the air.

In conclusion

we were surprised at some of the outcomes.

- The fabric of our pots were remarkably similar to ancient pottery.
- The Gault Clay had not been expected to survive firing because it has a very high Iron Sulphide content, but we got good pots from it.
- Some of the Seagrove Bay Member clays remained a beautiful green when the pots were first made but went black or brick-brown when fired. This was by far the best clay to use but all of the other clays, including the Wessex Formation clays proved useable.

Record keeping

A record was kept of the type of clay used for each pot and it seemed that all of the clays we used were possible candidates for ancient potters on the Island. Although the coastline would have been very different then the geology of the Island was such that all of the clays we used should have been exposed thousands of years ago, and available to our ancestors.
9. **CONCLUSION**

We all were surprised by how easy it was to collect clay and make pots, but that the firing process produced different qualities of finished item. We felt more experimentation was needed.

We found that small objects fired better, and that the original clay turned different unexpected colours. We discovered that ancient people were able to make use of local natural materials to produce cooking pots, bowls for food and water, tiles and beads.

The most fun part was putting back together the broken pots that had been damaged during the firing.

A teacher told us afterwards that school kilns might be too hot to bake the clay but that experimentation with a school kiln might be a good project with local Isle of Wight clays.

10. **SOURCES OF INFORMATION**

Information on the Isle of Wight and its geology can be found in -


- Geologists’ Association Guide No. 60. The Isle of Wight, by Allan Insole, Brian Daley and Andy Gale. ISBN 0-900717-54-8

11. **LINKS TO THE ENGLISH NATIONAL CURRICULUM**

Whilst it is possible to find reference to varying areas of the curriculum, a school activity based on the experiences gained by our young learners could support –

*Science programmes of study: key stages 1 and 2. National curriculum in England. September 2013*

Year 2 – Use of everyday materials
“…the suitability of a variety of everyday materials, including … rock … for particular uses”.

Years 3 and 4 – Working scientifically,
Developing experimental skills and investigations.
For Rocks “… explore different types of rocks and soils …” including comparing and grouping together different types of rocks on the basis of their appearance.


Understanding the use of different materials, including clay.


Key Stage 2, Stone Age to Iron Age Britain.

12. THE WORK OF THE ISLAND HERITAGE SERVICE

Dinosaur Isle was formerly part of the Isle of Wight Council Museum Service - however in 2005 the Museum Service, Record Office, Local History Library Service, and the Archaeology and Historic Environment Service combined to form the Isle of Wight Heritage Service (IWHS); now called ‘The Island Heritage Service’.

The function of the IHS is to provide –

- the operation of local authority museums open to the public,
- the long term custodianship of local historic and scientific collections, and associated information,
- education and outreach services,
- professional advice to individuals and organisations on heritage matters, and on the palaeontological/ geological history of the Island,
- support for enquiries and identifications relating to historic objects and scientific specimens.

13. CONTACT DETAILS

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14. **PRODUCED BY**

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Issue 1   April 2016

15. **ACKNOWLEDGMENTS**

The project took place with members of the Young Archaeologists Club on the Isle of Wight, along with support from staff of the Island Heritage Service who provided access to real archaeological remains for us to compare. Particular thanks go to Delian Backhouse-Fry, Joy Verrinder and Corina Westwood.

16. **PICTURE (and other data) CREDITS and SOURCES**

All pictures, map 1 and table by T.Price, original article by T.Price. Front cover picture is of the Wessex Formation rocks at Yaverland, Sandown Bay.

17. **OBTAINING FURTHER COPIES**

This document is available as a pdf file from the webpage [www.dinosaurisle.com/info.aspx](http://www.dinosaurisle.com/info.aspx)  

Copies in paper form may be collected from the museum (please phone first), or posted (printing and postage charges may be levied) but please consider accessing it via the website first to conserve paper.

18. **FEEDBACK**

Please let us know if you have been using this document as part of your studies. We would like to know what you think about it. If you think it should contain more information to support your studies then we would also like to know. Please send any comments to the Community Learning Officer.
Picture 5: Dinosaur Isle in the winter.